AMENDMENTS TO THE CLAIMS

This listing of the claims replaces all prior versions, and listings of claims in the application:

cl 1. (Previously Presented) A method of adjusting a volume of a fluid supplied to a patient, the method comprising the steps of:

(a) supplying a plurality of volumes of fluid to a patient during a like plurality of inspiratory phases of a respiratory cycle of such a patient, each volume of fluid being supplied at an inspiratory positive airway pressure during a corresponding inspiratory phase;

(b) determining, for each inspiratory phase, a tidal volume of fluid received by such a patient;

(c) determining an average tidal volume of fluid received by such a patient from the volumes of fluid received by such a patient during the plurality of inspiratory phases, wherein the average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

(d) comparing the average tidal volume to a predetermined target tidal volume; and

(e) adjusting the inspiratory positive airway pressure based on the comparison.

2. (Previously Presented) The method as set forth in claim 1, wherein step (b) includes:

estimating, for each inspiratory phase, a volume of fluid leaked from a breathing gas supply system that supplies such a patient with the plurality of volumes of fluid; and

combining, for each inspiratory phase, the volume of fluid leaked and the volume of fluid supplied to such a patient to obtain the tidal volume of fluid received by such a patient.

3. (Previously Presented) The method as set forth in claim 1, wherein step (e) includes:

C1 increasing the inspiratory positive airway pressure responsive to the average tidal volume being is less than a predetermined target tidal volume;

decreasing the inspiratory positive airway pressure responsive to the average tidal volume being greater than the predetermined target tidal volume; and

maintaining the inspiratory positive airway pressure responsive to the average tidal volume being within a predetermined offset volume of the predetermined target tidal volume.

4. (Original) The method as set forth in claim 3, wherein the inspiratory positive airway pressure is one of (a) increased and (b) decreased by a predetermined pressure.

5. (Original) The method as set forth in claim 4, wherein the predetermined pressure is approximately 0.1 cm H_2O.

6. (Original) The method as set forth in claim 1, further comprising:

comparing a current inspiratory positive airway pressure to a maximum inspiratory positive airway pressure and a minimum inspiratory positive airway pressure; and

preventing adjusting of the inspiratory positive airway pressure in step (e) if one of (1) the current inspiratory positive airway pressure is greater than the maximum inspiratory positive airway pressure and (2) the current inspiratory positive airway pressure is less than the minimum inspiratory positive airway pressure.

7. (Previously Presented) A method of supplying fluid to a patient, comprising:

(a) supplying a first volume of fluid to a patient at a first inspiratory positive airway pressure;

(b) determining, for the first volume of fluid supplied to such a patient, a first tidal volume of fluid received by such a patient;

(c) supplying a second volume of fluid to such a patient at the first inspiratory positive airway pressure;

(d) determining, for the second tidal volume of fluid supplied to such a patient, a second volume of fluid received by such patient;

(e) determining, based on the first and the second tidal volumes of fluid received by such a patient, a first average tidal volume of fluid received by such patient, wherein the first average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

(f) comparing the first average tidal volume to a predetermined target tidal volume; and

(g) adjusting the first inspiratory positive airway pressure to a second inspiratory positive airway pressure based on the comparison in comparing step (f).

8. (Previously Presented) The method as set forth in claim 7, further comprising:

(h) supplying a third volume of fluid to such a patient at the second inspiratory positive airway pressure;

(i) determining, for the third tidal volume of fluid supplied to such a patient, a third volume of fluid received by such a patient;

(j) determining, based on the second and the third tidal volumes of fluid received by such a patient, a second average tidal volume of fluid received by such a patient, wherein the second average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

(k) comparing the second average tidal volume to the predetermined target tidal volume; and

(l) adjusting the second inspiratory positive airway pressure to a third inspiratory positive airway pressure based on the comparison in comparing step (k).

9. (Original) The method as set forth in claim 8, wherein at least two of the first, the second, and the third inspiratory positive airway pressures are the same.

10. (Previously Presented) The method as set forth in claim 7, wherein the second inspiratory positive airway pressure is greater than the first inspiratory positive airway pressure responsive to the first average tidal volume being less than the predetermined target tidal volume, and wherein the second inspiratory positive airway pressure is less than the first inspiratory positive airway pressure responsive to the first average tidal volume being greater than the predetermined target tidal volume.

11. (Previously Presented) The method as set forth in claim 7, wherein the second inspiratory positive airway pressure is the same as the first inspiratory positive airway pressure responsive to the first average tidal volume being within a predetermined offset volume of the predetermined target tidal volume.

12. (Original) The method as set forth in claim 7, wherein at least one of the first volume of fluid received by such a patient and the second volume of fluid received by such a patient is determined by performing one of (1) leak estimation and (2) regression analysis, and wherein the leak estimation includes:

estimating a volume of fluid leaked from a breathing gas supply system that supplies such a patient with the first and the second volumes of fluid; and

combining the volume of fluid leaked and the volume of fluid supplied to such a patient to obtain the volume of fluid received by such a patient.

13. (Previously Presented) An apparatus for supplying fluid to a patient, the apparatus comprising:

a pressure generating system adapted to provide a flow of fluid at one of a variable pressure and a variable flow;

a patient circuit operatively coupled to the pressure generating system to deliver the flow of fluid to a patient;

an interface device operatively coupled to the patient circuit to communicate the flow of fluid to an airway of a patient;

at least one sensor operatively coupled to one of the pressure generating system, the patient circuit, and the interface device to detect a parameter indicative of a volume of fluid delivered to such a patient; and

a controller operatively coupled to the sensor and the pressure generating system, wherein the controller:

(a) determines, for each inspiratory phase of a respiratory cycle of such a patient, a tidal volume of fluid received by such a patient based on the parameter indicative of a volume of fluid delivered to such a patient provided by the sensor;

(b) determines an average tidal volume of fluid received by such a patient over a plurality of inspiratory phases, wherein the average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

(c) compares the average tidal volume of fluid received by such a patient to a predetermined target tidal volume; and

(d) causes the pressure generating system to adjust one a pressure and a rate of flow of fluid output thereby based on the comparison.

14. (Previously Presented) The apparatus as set forth in claim 13, wherein the controller causes the pressure generating system to:

(e) increase one of a pressure and a rate of the flow of fluid output by the pressure generating system responsive to the average tidal volume of fluid being less than the predetermined target tidal volume;

(g) decrease one of a pressure and rate of the flow of fluid output by the pressure generating system responsive to the average tidal volume of being greater than the predetermined target tidal volume; and

(g) maintain one of a pressure and a rate of the flow of fluid output by the pressure generating system responsive to the average tidal volume of fluid being within a predetermined offset volume of the predetermined target tidal volume.

15. (Original) An apparatus as set forth in claim 13, wherein the controller prevents adjusting one of a pressure and rate of flow of fluid output by the pressure generating system if one of (a) the current pressure is greater than a predetermined maximum pressure and (b) the current pressure is less than a predetermined minimum pressure.

16. (Original) An apparatus as set forth in claim 13, wherein the pressure generating system includes:

a fluid source that outputs the flow of fluid at one of a predetermined pressure and a predetermined flow rate; and

a pressure/flow regulator operatively coupled to the pressurized fluid source to vary one of a pressure and a rate of flow of the flow of fluid output by the fluid source.

17. (Previously Presented) An apparatus as set forth in claim 13, wherein the at least one sensor includes a flow sensor adapt to detect a rate of flow of fluid in the patient circuit as the parameter indicative of a volume of fluid delivered to such a patient, and a pressure sensor

adapted to detect a pressure at which the fluid is supplied to such a patient, and wherein the controller estimates:

(a) a volume of fluid leaked to atmosphere based on a pressure at which the fluid is supplied to the patient measured by the pressure sensor,

(b) a tidal volume of fluid received by such patient based on a difference between the volume of fluid supplied to such patient and the volume of fluid leaked to atmosphere;

(c) an average tidal volume of fluid received by such a patient during each inhalation based on tidal volumes of fluid received by such a patient during a plurality of inhalations; and

(d) a difference between the average tidal volume and the predetermined target tidal volume.

18. (Previously Presented) An apparatus as set forth in claim 13, wherein the controller causes the pressure generating system to adjust one of the pressure and the flow of fluid supplied to the patient as a function of a moving average of the tidal volumes of fluid received by the patient.

19. (Previously Presented) An apparatus for supplying fluid to a patient, the apparatus comprising:

pressure generating means for providing a flow of fluid at one of a variable pressure and a variable flow rate;

delivering means for delivering the flow of fluid to a patient;

interfacing means for communicating the flow of fluid to an airway of a patient;

sensing means for sensing a parameter indicative of a volume of fluid delivered to such a patient; and

processing means for:

(a) determining, for each inspiratory phase of a respiratory cycle of such a patient, a tidal volume of fluid received by such a patient based on the parameter indicative of a volume of fluid delivered to such a patient provided by the sensing means;

(b) determining an average tidal volume of fluid received by such a patient over a plurality of inspiratory phases, wherein the average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

(c) comparing the average tidal volume of fluid received by such a patient to a predetermined target tidal volume; and

(d) causing the pressure generating means to adjust at least one of a pressure and a rate of flow of fluid output thereby based on the comparison.

20. (Previously Presented) An apparatus as set forth in claim 19, wherein the processing means further determines:

a volume of fluid leaked into atmosphere as a function of the pressure at which the fluid is supplied to the patient;

a tidal volume of fluid received by the patient as a function of a difference between the volume of fluid supplied to the patient and the volume of fluid leaked into atmosphere;

an average tidal volume of fluid received by such a patient during each an inspiratory phase based on tidal volumes of fluid received by the patient during a plurality of inspiratory phases; and

a difference between the average tidal volume of fluid and the predetermined target tidal volume.

21. (Previously Presented) An apparatus as set forth in claim 19, wherein the processing means causes the pressure generating means to:

(e) increase one of a pressure and a rate of flow at which the fluid is supplied to the patient responsive to the average tidal volume of fluid supplied to the patient being less than the predetermined target tidal volume;

(f) decrease one of a pressure and a rate of flow at which the fluid is supplied to the patient responsive to the average tidal volume of fluid supplied to the patient being greater than the predetermined target tidal volume; and

(g) maintain one of a pressure and a rate of flow at which the fluid is supplied to the patient responsive to the average tidal volume of fluid supplied to the patient being within an offset volume of the predetermined target tidal volume.

22. (Previously Presented) An apparatus as set forth in claim 19, wherein the processing means causes the pressure generating means to adjust one of a pressure and a flow of the fluid supplied to the patient as a function of a moving average of the tidal volumes of fluid received by the patient.

23. (Previously Presented) An apparatus for adjusting a volume of a fluid supplied to a patient, the apparatus comprising:

supplying means for supplying a plurality of volumes of fluid to a patient during a like plurality of inhalations by such a patient, with each volume of fluid supplied at an inspiratory positive airway pressure during a corresponding inspiratory phase;

tidal volume determining means for determining, for each inspiratory phase, a tidal volume of fluid received by such a patient;

average tidal volume determining means for determining an average tidal volume of fluid received by such a patient from the tidal volumes of fluid received by such a patient during the plurality of inspiratory phases, wherein the average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

comparing means for comparing the average tidal volume to a predetermined target tidal volume; and

adjusting means for adjusting the inspiratory positive airway pressure based on the comparison.

24. (Previously Presented) The apparatus as set forth in claim 23, wherein the tidal volume determining means includes:

leak estimating means for estimating, for each inspiratory phase, a volume of fluid leaked from the supplying means; and

combining means for combining, for each inspiratory phase, the volume of fluid leaked and the volume of fluid supplied to the patient to obtain the tidal volume of fluid received by the patient.

25. (Previously Presented) The apparatus as set forth in claim 23, wherein the adjusting means:

increases the inspiratory positive airway pressure responsive to the average tidal volume being less than a predetermined target tidal volume;

decreases the inspiratory positive airway pressure responsive to the average tidal volume being greater than the predetermined target tidal volume; and

maintains the inspiratory positive airway pressure responsive to the average tidal volume being within a predetermined offset volume of the predetermined target tidal volume.

26. (Original) The apparatus as set forth in claim 23, further comprising:

comparing means for comparing a current inspiratory positive airway pressure to a maximum inspiratory positive airway pressure and a minimum inspiratory positive airway pressure; and

preventing means for preventing adjusting of the inspiratory positive airway pressure if one of (1) the current inspiratory positive airway pressure is greater than the

maximum inspiratory positive airway pressure and (2) the current inspiratory positive airway pressure is less than the minimum inspiratory positive airway pressure.

27. (Previously Presented) An apparatus for supplying a desired volume of a fluid to a patient, the apparatus comprising:

supplying means for supplying a first volume of fluid to a patient at a first inspiratory positive airway pressure;

cl determining means for determining, for the first volume of fluid supplied to such a patient, a first tidal volume of fluid received by such a patient, wherein the supplying means supplies a second volume of fluid to such a patient at the first inspiratory positive airway pressure, and wherein the determining means determines, for the second volume of fluid supplied to such a patient, a second tidal volume of fluid received by such a patient;

averaging means for determining, based on the first and the second tidal volumes of fluid received by such a patient, a first average tidal volume of fluid received by such a patient, wherein the first average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

comparing means for comparing the first average tidal volume to a predetermined target tidal volume; and

adjusting means for adjusting the first inspiratory positive airway pressure to a second inspiratory positive airway pressure based on the comparison of the first average volume to the predetermined target volume.

28. (Previously Presented) The apparatus as set forth in claim 27, wherein:

the supplying means supplies a third volume of fluid to such a patient at the second inspiratory positive airway pressure;

the determining means determines, for the third tidal volume of fluid supplied to such a patient, a third volume of fluid received by such a patient;

the averaging means determines, based on the second and the third tidal volumes of fluid received by such a patient, a second average tidal volume of fluid received by such a patient, wherein the second average tidal volume is determined irrespective of a period of time during which the plurality of inspiratory phases occur;

the comparing means compares the second average tidal volume to the predetermined target tidal volume; and

the adjusting means adjusts the second inspiratory positive airway pressure to a third inspiratory positive airway pressure based on the comparison of the second average tidal volume to the predetermined target tidal volume.

29. (Original) The apparatus as set forth in claim 28, wherein at least two of the first, second and third inspiratory positive airway pressures are the same.

30. (Previously Presented) The apparatus as set forth in claim 27, wherein the second inspiratory positive airway pressure is greater than the first inspiratory positive airway pressure responsive to the first average tidal volume being less than the predetermined target tidal volume, and wherein the second inspiratory positive airway pressure is less than the first inspiratory positive airway pressure responsive to the first average tidal volume being greater than the predetermined target tidal volume.

31. (Previously Presented) The apparatus as set forth in claim 27, wherein the second inspiratory positive airway pressure is the same as the first inspiratory positive airway pressure responsive to the first average tidal volume being within a predetermined offset volume of the predetermined target tidal volume.

32. (Previously Presented) The apparatus as set forth in claim 27, further comprising leak estimating means for determining at least one of the first tidal volume of fluid received by the patient and the second tidal volume of fluid received by the patient by performing

one of (a) leak estimation and (b) regression analysis, and wherein the leak estimating performs leak estimation by:

(1) estimating a volume of fluid leaked from the supplying means; and

(2) combining the volume of fluid leaked from the supplying means and the volume of fluid supplied to such a patient to obtain the volume of fluid received by such a patient.

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